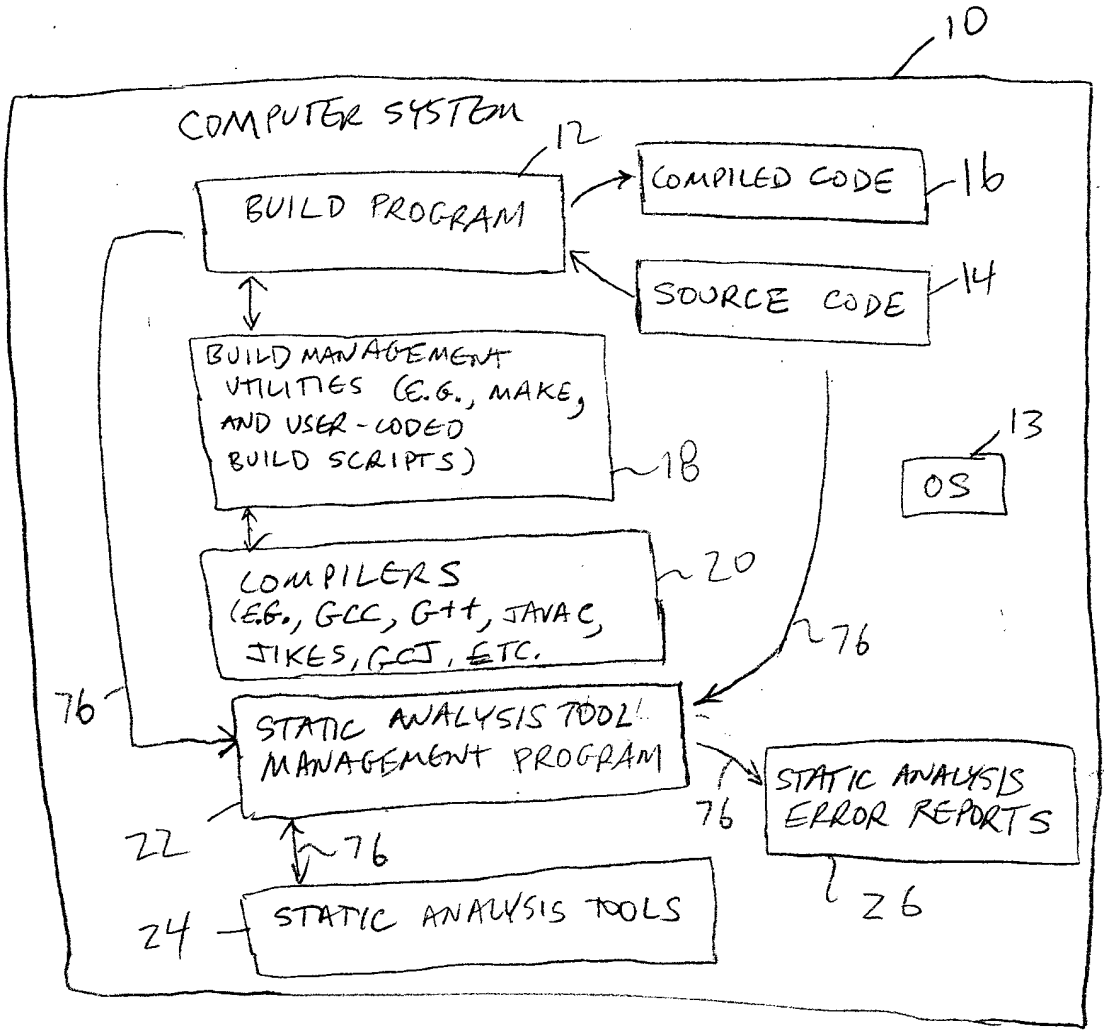
10
COMPUTER SYSTEM
12
BUILD PROGRAM
COMPILED CODE
16
SOURCE CODE
14
BUILD MANAGEMENT UTILITIES (E.G., MAKE, AND USER-CODED BUILD SCRIPTS)
18
13
OS
COMPILERS (E.G., GCC, G++, JAVAC, JIKES, GCJ, ETC.
20
76
76
STATIC ANALYSIS TOOL MANAGEMENT PROGRAM
STATIC ANALYSIS ERROR REPORTS
76
22
76
24
STATIC ANALYSIS TOOLS
26

FIG. 1

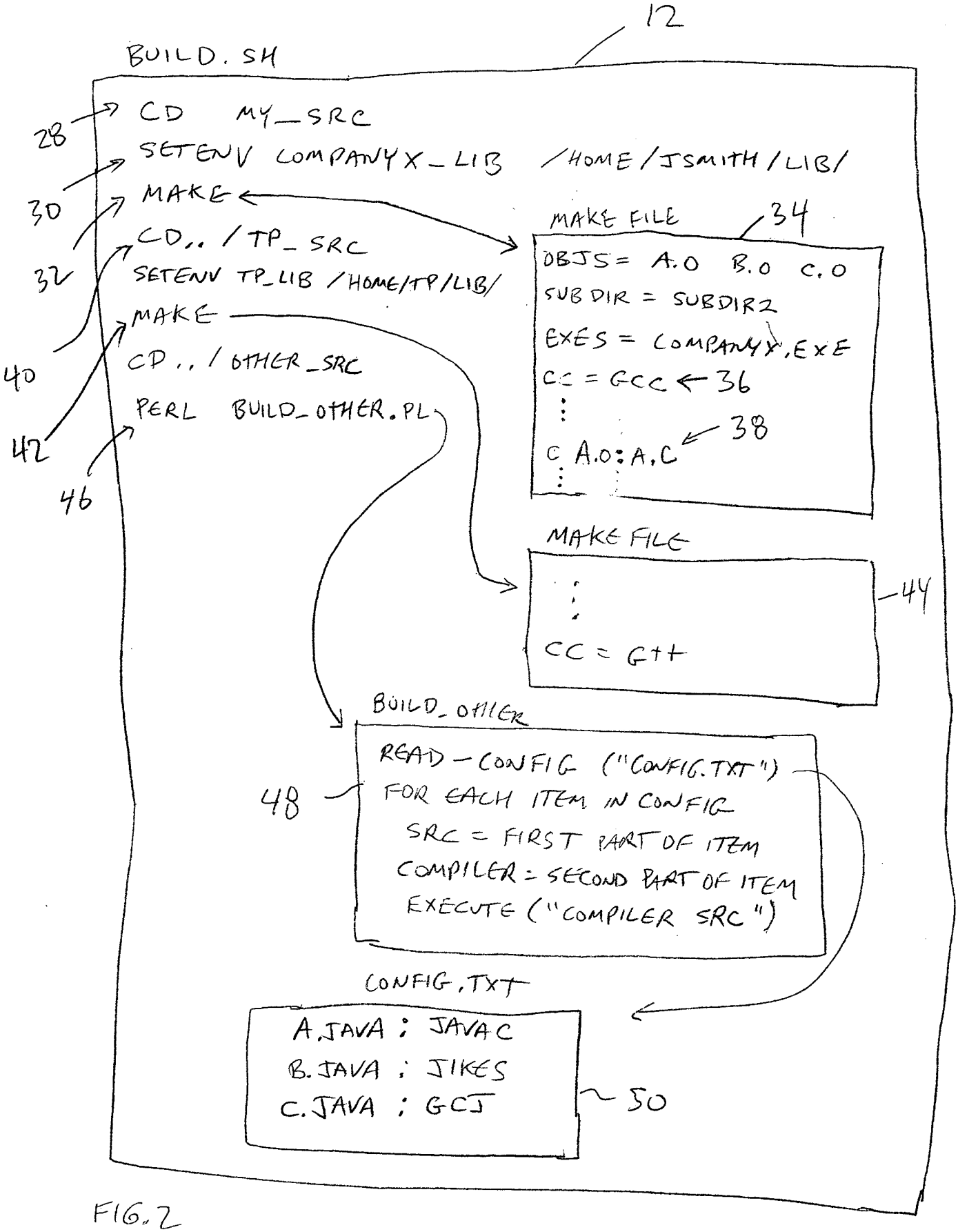
12
BUILD.SH
28
CD MY_SRC
SETENV COMPANYX_LIB /HOME/JSMITH/LIB/
30
MAKE
32
CD.. /TP_SRC
SETENV TP_LIB /HOME/TP/LIB/
MAKE
40
CD.. /OTHER_SRC
42
PERL BUILD_OTHER.PL
46
MAKE FILE
34
OBJS = A.O B.O C.O
SUBDIR = SUBDIR2
EXES = COMPANYX.EXE
CC = GCC
36
C A.O: A.C
38
MAKE FILE
44
CC = G++
BUILD_OTHER
48
READ-CONFIG ("CONFIG.TXT")
FOR EACH ITEM IN CONFIG
SRC = FIRST PART OF ITEM
COMPILER = SECOND PART OF ITEM
EXECUTE ("COMPILER SRC")
CONFIG.TXT
A.JAVA ; JAVAC
B.JAVA ; JIKES
C.JAVA ; GCJ
50

FIG. 2

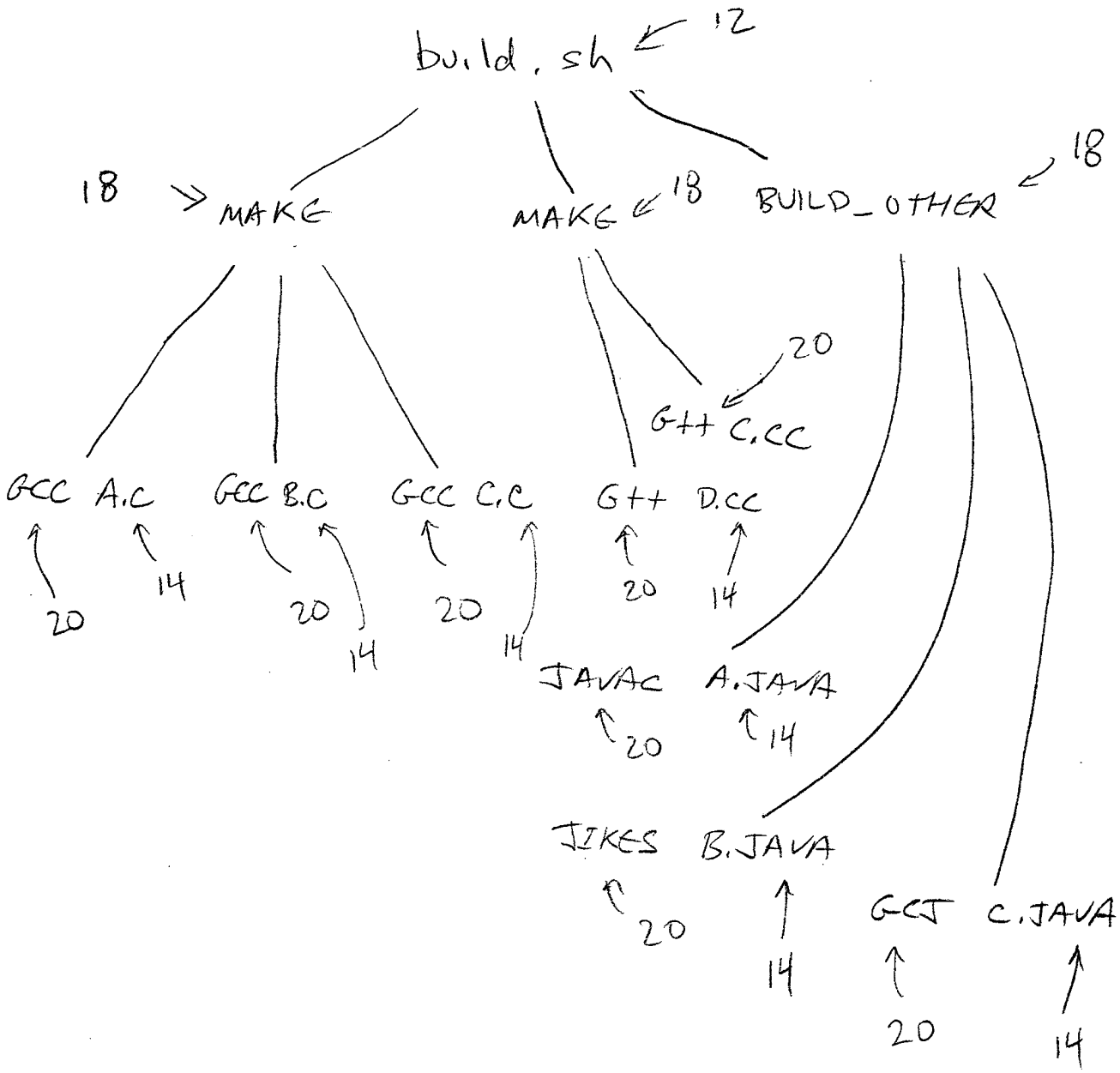
build.sh
12
18
MAKE
MAKE
18
BUILD_OTHER
18
20
G++ C.CC
GCC A.C
GCC B.C
GCC C.C
G++ D.CC
20
14
20
14
20
14
20
14
JAVAC
A.JAVA
20
14
JIKES
B.JAVA
GCJ
C.JAVA
20
14
20
14

FIG. 3

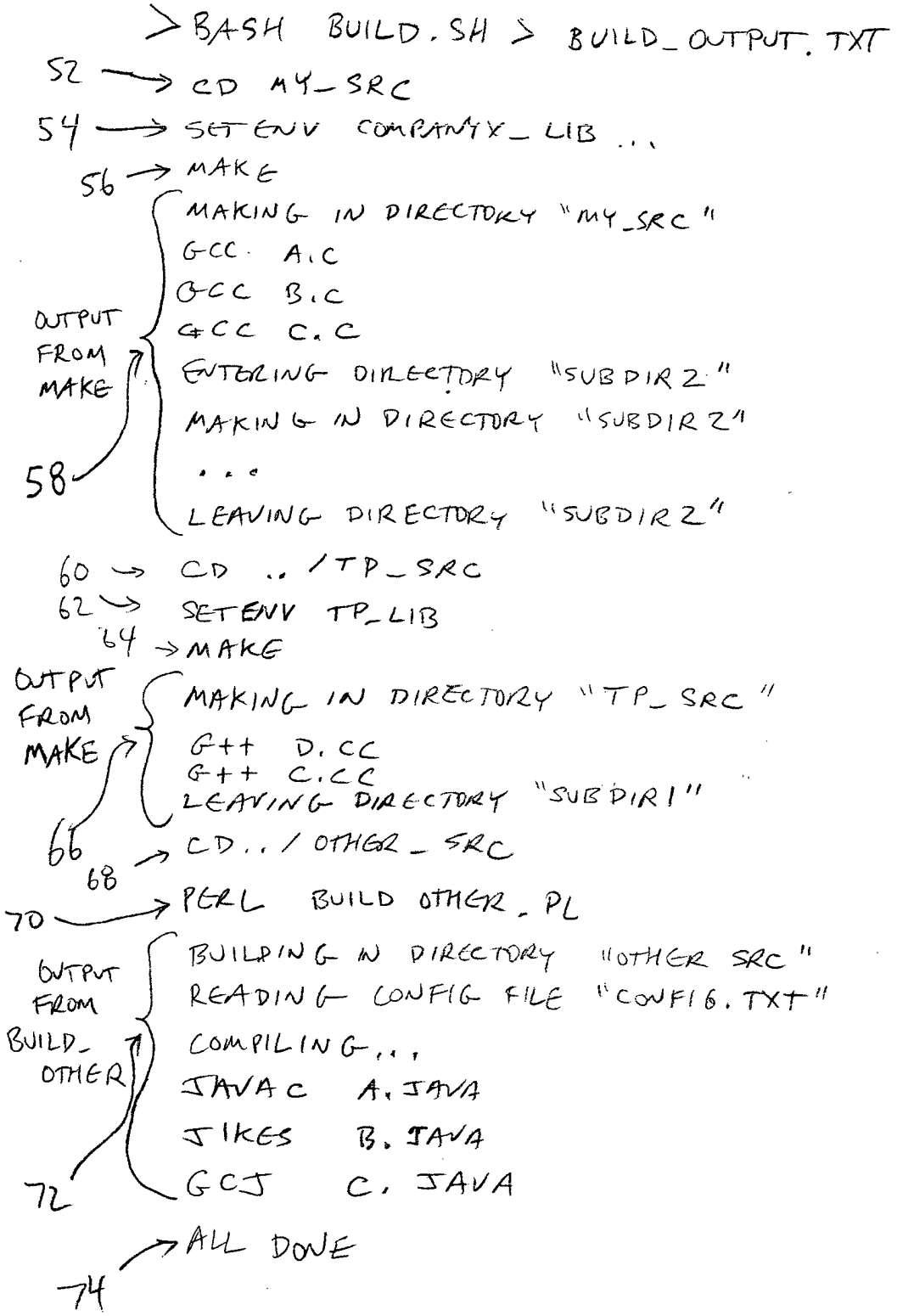
> BASH BUILD.SH > BUILD_OUTPUT.TXT
52
CD MY_SRC
54
SETENV COMPANYX_LIB ...
56
MAKE
OUTPUT FROM MAKE
MAKING IN DIRECTORY "MY_SRC"
GCC A.C
GCC B.C
GCC C.C
ENTERING DIRECTORY "SUBDIR2"
MAKING IN DIRECTORY "SUBDIR2"
...
LEAVING DIRECTORY "SUBDIR2"
58
60
CD ../TP_SRC
62
SETENV TP_LIB
64
MAKE
OUTPUT FROM MAKE
MAKING IN DIRECTORY "TP_SRC"
G++ D.CC
G++ C.CC
LEAVING DIRECTORY "SUBDIR1"
66
68
CD../OTHER_SRC
70
PERL BUILD OTHER_PL
OUTPUT FROM BUILD_OTHER
BUILDING IN DIRECTORY "OTHER SRC"
READING CONFIG FILE "CONFIG.TXT"
COMPILING...
JAVAC A.JAVA
JIKES B.JAVA
GCJ C.JAVA
72
ALL DONE
74

FIG. 4

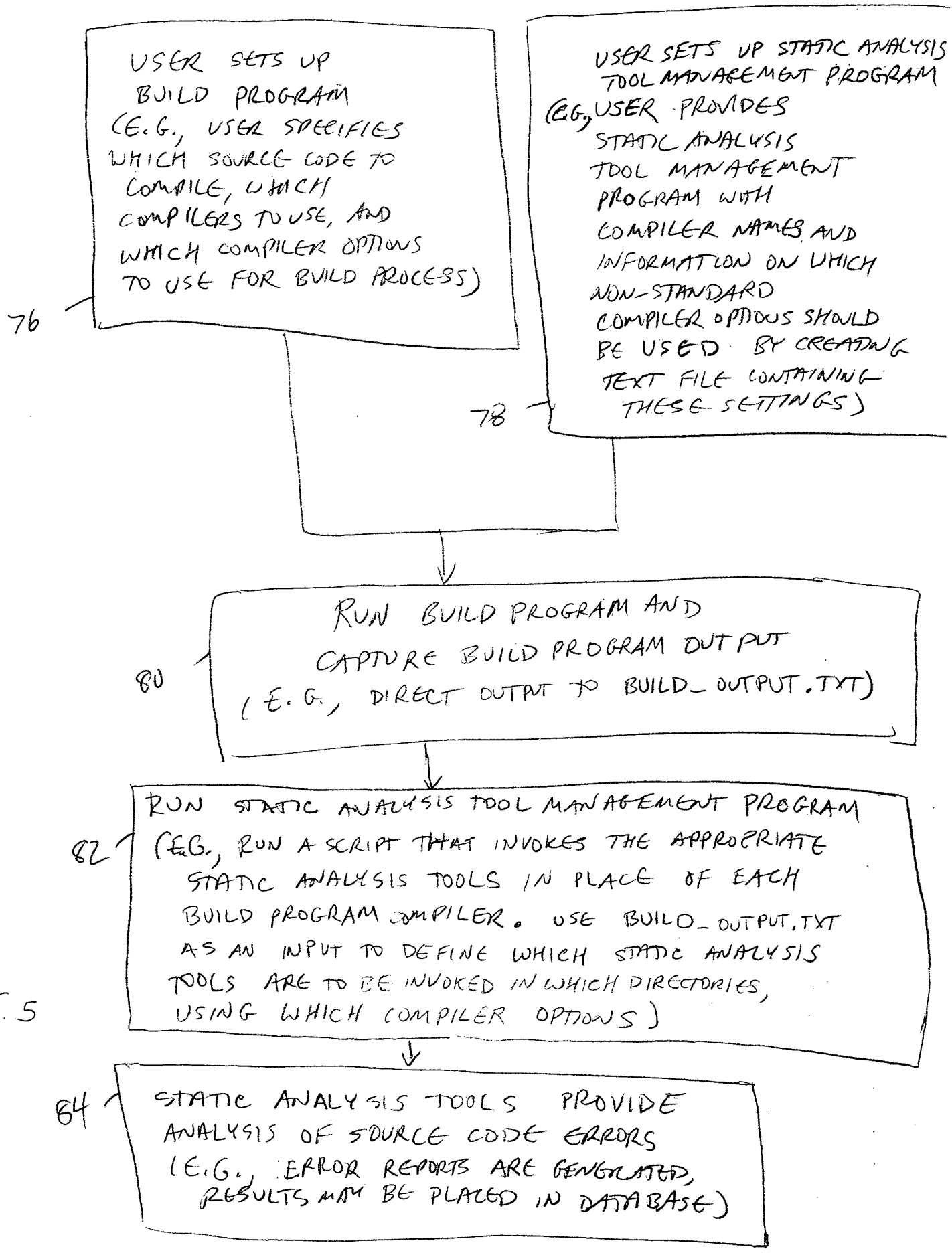
USER SETS UP BUILD PROGRAM (E.G., USER SPECIFIES WHICH SOURCE CODE TO COMPILE, WHICH COMPILERS TO USE, AND WHICH COMPILER OPTIONS TO USE FOR BUILD PROCESS)
76
USER SETS UP STATIC ANALYSIS TOOL MANAGEMENT PROGRAM (E.G., USER PROVIDES STATIC ANALYSIS TOOL MANAGEMENT PROGRAM WITH COMPILER NAMES AND INFORMATION ON WHICH NON-STANDARD COMPILER OPTIONS SHOULD BE USED BY CREATING TEXT FILE CONTAINING THESE SETTINGS)
78
RUN BUILD PROGRAM AND CAPTURE BUILD PROGRAM OUTPUT (E.G., DIRECT OUTPUT TO BUILD_OUTPUT.TXT)
80
RUN STATIC ANALYSIS TOOL MANAGEMENT PROGRAM (E.G., RUN A SCRIPT THAT INVOKES THE APPROPRIATE STATIC ANALYSIS TOOLS IN PLACE OF EACH BUILD PROGRAM COMPILER. USE BUILD_OUTPUT.TXT AS AN INPUT TO DEFINE WHICH STATIC ANALYSIS TOOLS ARE TO BE INVOKED IN WHICH DIRECTORIES, USING WHICH COMPILER OPTIONS)
82
STATIC ANALYSIS TOOLS PROVIDE ANALYSIS OF SOURCE CODE ERRORS (E.G., ERROR REPORTS ARE GENERATED, RESULTS MAY BE PLACED IN DATABASE)
84

FIG. 5

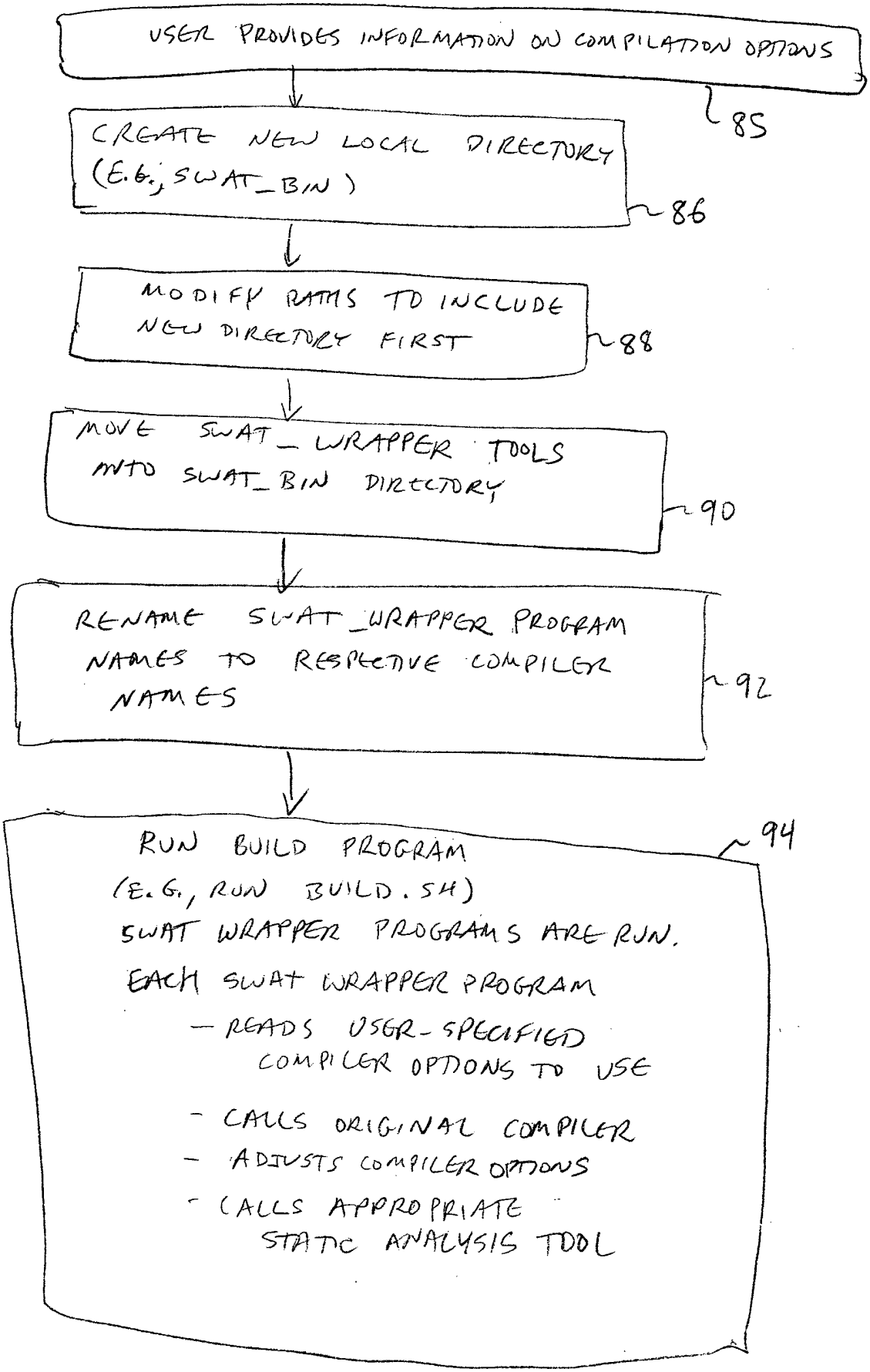
USER PROVIDES INFORMATION ON COMPILATION OPTIONS
85
CREATE NEW LOCAL DIRECTORY (E.G., SWAT_BIN)
86
MODIFY PATHS TO INCLUDE NEW DIRECTORY FIRST
88
MOVE SWAT_WRAPPER TOOLS INTO SWAT_BIN DIRECTORY
90
RENAME SWAT_WRAPPER PROGRAM NAMES TO RESPECTIVE COMPILER NAMES
92
RUN BUILD PROGRAM
94
(E.G., RUN BUILD.SH)
SWAT WRAPPER PROGRAMS ARE RUN.
EACH SWAT WRAPPER PROGRAM
- READS USER-SPECIFIED COMPILER OPTIONS TO USE
- CALLS ORIGINAL COMPILER
- ADJUSTS COMPILER OPTIONS
- CALLS APPROPRIATE STATIC ANALYSIS TOOL

FIG. 6

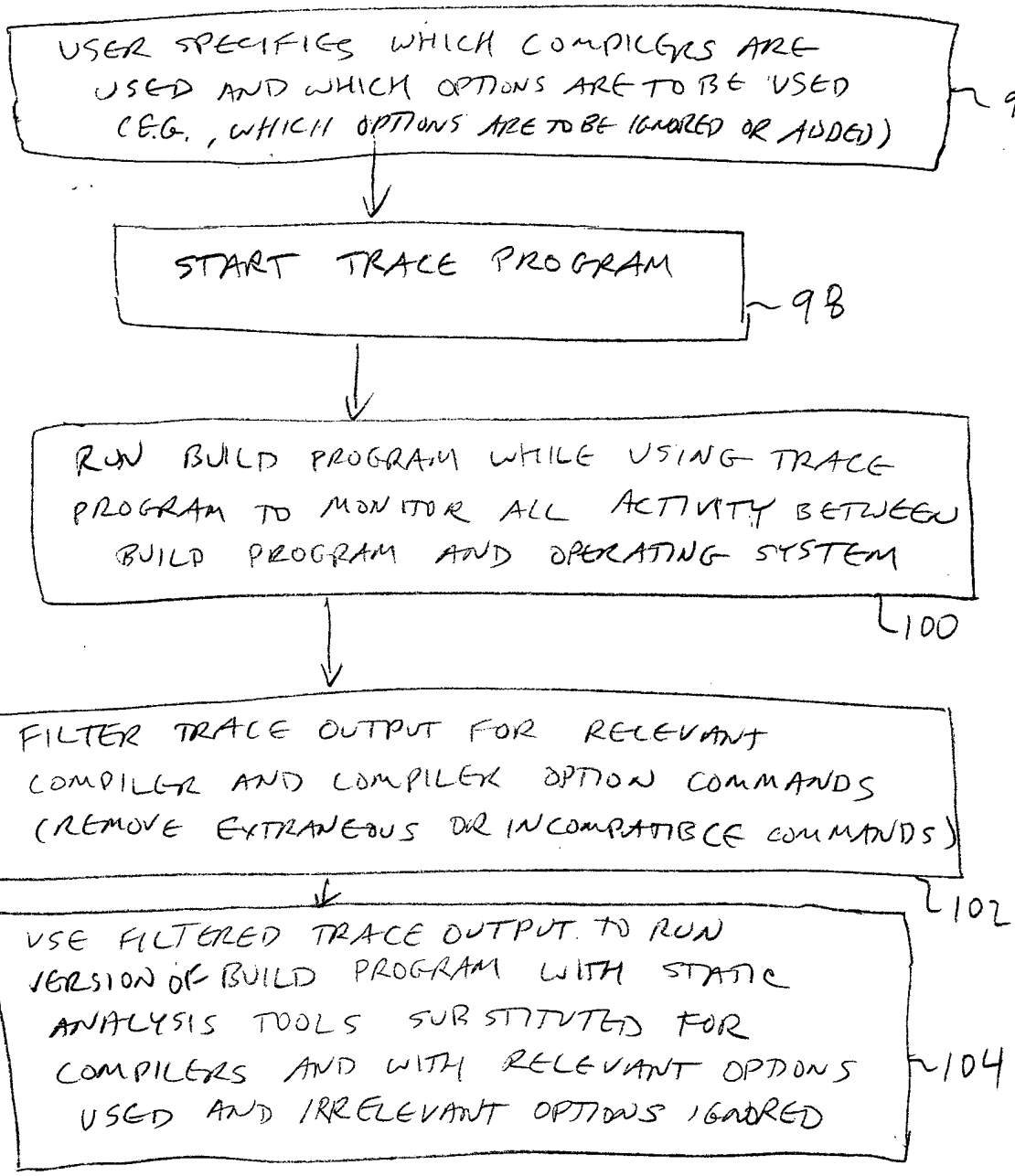
USER SPECIFIES WHICH COMPILERS ARE USED AND WHICH OPTIONS ARE TO BE USED (E.G., WHICH OPTIONS ARE TO BE IGNORED OR ADDED)
96
START TRACE PROGRAM
98
RUN BUILD PROGRAM WHILE USING TRACE PROGRAM TO MONITOR ALL ACTIVITY BETWEEN BUILD PROGRAM AND OPERATING SYSTEM
100
FILTER TRACE OUTPUT FOR RELEVANT COMPILER AND COMPILER OPTION COMMANDS (REMOVE EXTRANEOUS OR INCOMPATIBLE COMMANDS)
102
USE FILTERED TRACE OUTPUT TO RUN VERSION OF BUILD PROGRAM WITH STATIC ANALYSIS TOOLS SUBSTITUTED FOR COMPILERS AND WITH RELEVANT OPTIONS USED AND IRRELEVANT OPTIONS IGNORED
104

FIG. 7

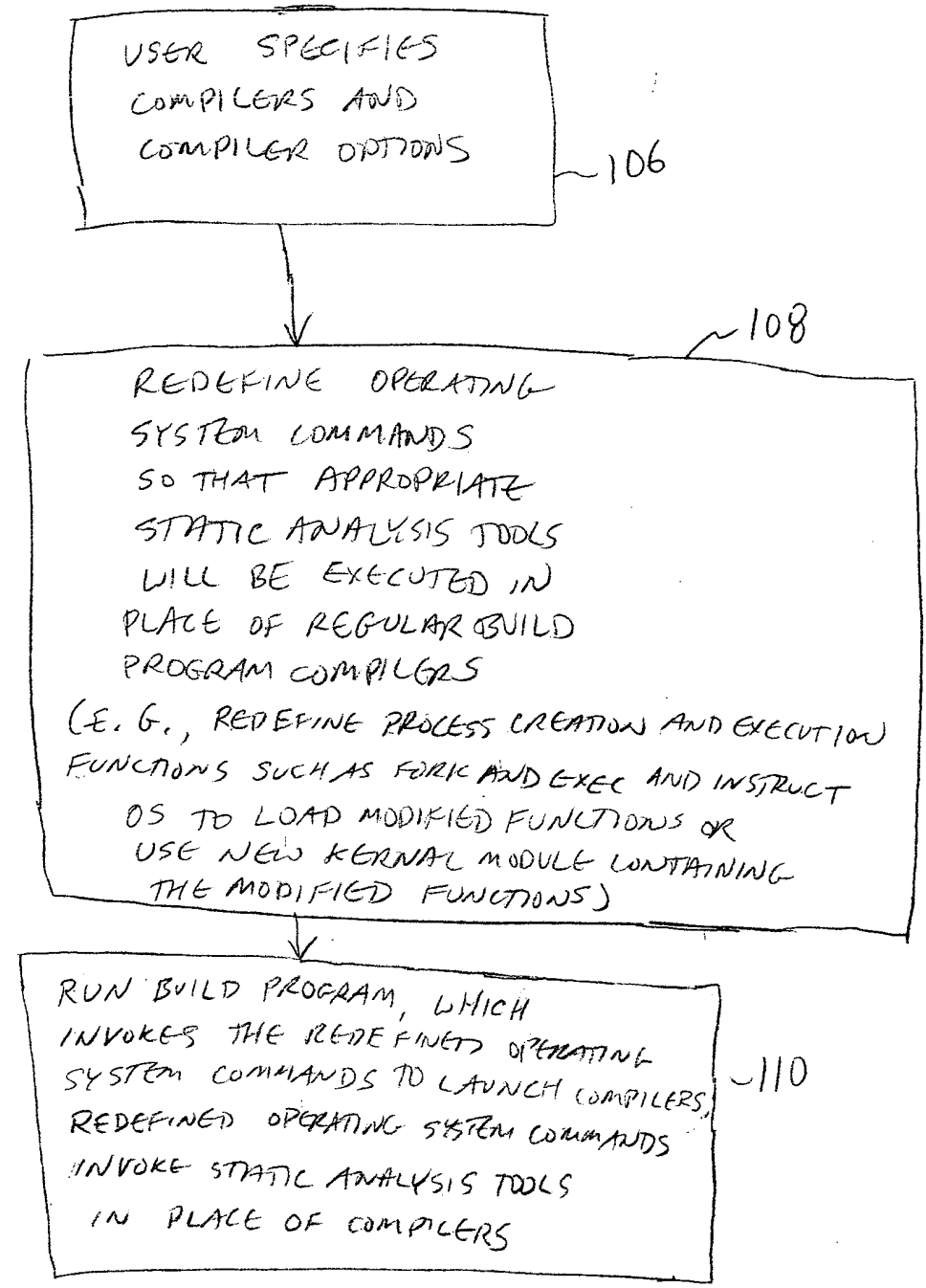
USER SPECIFIES COMPILERS AND COMPILER OPTIONS
106
108
REDEFINE OPERATING SYSTEM COMMANDS SO THAT APPROPRIATE STATIC ANALYSIS TOOLS WILL BE EXECUTED IN PLACE OF REGULAR BUILD PROGRAM COMPILERS
(E.G., REDEFINE PROCESS CREATION AND EXECUTION FUNCTIONS SUCH AS FORK AND EXEC AND INSTRUCT OS TO LOAD MODIFIED FUNCTIONS OR USE NEW KERNAL MODULE CONTAINING THE MODIFIED FUNCTIONS)
RUN BUILD PROGRAM, WHICH INVOKES THE REDEFINED OPERATING SYSTEM COMMANDS TO LAUNCH COMPILERS, REDEFINED OPERATING SYSTEM COMMANDS INVOKE STATIC ANALYSIS TOOLS IN PLACE OF COMPILERS
110

FIG. 8